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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/009,730	03/12/2002	Lars Stormbom	0365-0525P	6013

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EXAMINER	
KERVEROS, JAMES C	

ART UNIT	PAPER NUMBER
2133	12

DATE MAILED: 12/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/009,730	STORMBOM ET AL.	
	Examiner	Art Unit	
	James C Kerveros	2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 12-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 12, the phrase "a net-like" renders the claim indefinite because the claim includes elements not actually disclosed (those encompassed by "or the like"), thereby rendering the scope of the claim(s) unascertainable. See MPEP § 2173.05(d).

Claims 13 and 14 are, also, rejected because of their dependency on a rejected main claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5, 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garvey, III et al. (US 5656767).

Regarding independent Claim 1, Garvey discloses a method for detecting the lubricant type and degree of water contamination present in a liquid, such as a lubricating oil, comprising:

Electrically measuring properties, such as measuring frequency changes corresponding to the dielectric constant of the liquid, using a relative-value measurement method by detecting the relative quantity of water present in a contaminated test sample of lubricating oil, including the use of an open grid capacitive sensor energized by a frequency variable oscillator that automatically responds to changes in the oil dielectric constant with corresponding frequency changes, and electrically measuring properties of the liquid by an absolute-value measurement method, using as a reference, a sample of new or uncontaminated test oil confined in wet surface contact with a grid sensor element, where the oscillator frequency changes are measured and recorded to generate a reference of the frequency-time relationship distinctive of the particular oil, corresponding to the dielectric coefficient of the liquid, see abstract.

Garvey doses not perform the measurements repeated at two different temperatures in rapid succession so that the water content of the liquid stays substantially constant. However, Garvey teaches that there is a relation between frequency change and temperature rise attributed to free and emulsified water in the oil and the percentage of free water in the lubricant system, as shown in Figure 8, with the water affinity rate, % H_2O/Hz, along the graph ordinate and corresponding natural frequency changes from the "base" or starting frequency over an approximately of one 1^0 C DELTA TEMPERATURE (ΔT) rise along the graph abscissa. The "base" frequency is the electrical property of the liquid measured at a first Temperature, T1, and the natural frequency change is the electrical property of the liquid at the end of the 1^0 C temperature increase (ΔT), which is measured at a second Temperature, T2, where T2=T1+ (ΔT) (column 15, line 24-28). It would have been obvious to a person of ordinary skill in the art to perform frequency measurements of the liquid at a range of temperature successions, in the

device of Garvey, for the purpose of determining the water content in a liquid corresponding to different temperatures, using Garvey's teachings, of water content as a frequency change due to temperature rise, would result in a more reliable water content measuring method, since the water content changes with the temperature.

Regarding independent Claim 9, Garvey discloses an apparatus for detecting the lubricant type and degree of water contamination present in a liquid, such as a lubricating oil, comprising:

A first electrical sensor means (open grid capacitive sensor 16) Figure 1, for measuring frequency changes corresponding to the dielectric constant of the liquid, by a relative-value measurement method by detecting the relative quantity of water present in a contaminated test sample of lubricating oil, including the use of an open grid capacitive sensor energized by a frequency variable oscillator that automatically responds to changes in the oil dielectric constant with corresponding frequency changes.

Garvey doses not disclose a second electrical sensor means for measuring the properties of the liquid by an absolute-value measurement method. However, Garvey discloses an open grid capacitive sensor 16, Figure 1, for measuring the properties of the liquid by an absolute-value measurement method, using as a reference, a sample of new or uncontaminated test oil confined in wet surface contact with the energized, open grid sensor, where the oscillator frequency changes are measured and recorded to generate a reference of the frequency-time relationship distinctive of the particular oil, corresponding to the dielectric coefficient of the liquid. It would have been obvious to a person of ordinary skill in the art to use the open grid sensor, in the device of Garvey, to measure water content, since the sensor is capable of sensing changes of the dielectric coefficient corresponding to water content for both the relative-value and absolute-

value measurement methods, thus improving the maintainability and reliability of the device by having to use one sensor versus two sensors.

Regarding Claim 2, Garvey doses not determine the dielectric coefficient of a dry liquid by measuring essentially simultaneously the (ε_r), and the temperature of the liquid at two different temperatures. However, Garvey teaches that there is a relation between frequency change and temperature rise attributed to free and emulsified water in the oil and the percentage of free water in the lubricant system. Figure 8 shows a chart of water affinity rate, % H_2O/Hz, corresponding to frequency changes from the base frequency over an approximately 1^0 C temperature rise (column 15, line 24-28). It would have been obvious to a person of ordinary skill in the art to perform temperature measurements of the liquid, in the device of Garvey, for the purpose of determining the water content in a liquid proportional to the corresponding to the dielectric coefficient of a dry liquid corresponding to different temperatures, since Garvey teaches percentage of water content per frequency, Hz, as a function of the temperature.

Regarding Claim 3, Garvey discloses capacitor sensor 16, Figures 1 and 2, for measuring the relative water content corresponding to the capacitance which is a function of the dielectric constant value of the tested oil.

Regarding Claim 4, Garvey uses the most recent data for compensating for the aging of the liquid, by recording a database of the water affinity rate correlations, and by applying the respective frequency differentials at the end of the test period representing the most recent data, see abstract.

Regarding Claim 5, Garvey teaches that the rise in temperature over a period of time increases the test oil dielectric constant value, indicative of the aging of the liquid, thus reducing

the frequency, which is a characteristic of the clean, dry, uncontaminated oil (column 14, line 10-16).

Regarding Claim 12, for examination purpose, the Examiner interprets the phrase "a net-like" to be a coaxial cable. Garvey discloses an optional electromagnet 20 placed vertically beneath and coaxially with the sensor element 16, where the sensor is a coaxial type compatible with a coaxial cable.

Claims 6-8, 10, 11, 13 and 14, are rejected under 35 U.S.C. 103(a) as being unpatentable over Garvey, III et al. (US 5656767) in view of Yamagishi et al. (US 5331287).

Regarding Claims 6-8, 13 and 14, Garvey does not disclose an auxiliary medium of a thin film polymer for determining the water content by measuring the dielectric coefficient. Also, Regarding Claims 10 and 11, Garvey does not disclose a sensor means formed by two interdigitated finger electrodes, which is sensitive to changes in the dielectric coefficient. However, Yamagishi discloses a sensor, which uses a conductive polymer as the active sensing material to monitor the concentration of water in nonaqueous or nonpolar media. The conductive polymer reversibly changes conductivity in measurable amounts with changes in the water content. Further, Yamagishi discloses a sensor including two interdigitated finger electrodes, Figure 2, with a conductive polymer deposited on the substrate as a thin film, over the electrodes, as the active sensing material to monitor the concentration of water in nonaqueous or nonpolar media. It would have been obvious to a person of ordinary skill in the art to use the sensor as taught by Yamagishi, in the water content device of Garvey, for the purpose of detecting changes in the dielectric coefficient proportional to the water content in an

oil emulsion, since the sensor employs conductive polymers, which are compact, simple, inexpensive, and easy to make.

Response to Arguments

Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

Pertinent Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(US 6609411), Benjamin G. et al. discloses measurement of the electrical properties of the transformer winding insulations that are influenced by water, or by taking samples of oil, recording the oil temperature, and using appropriate correlation curves to determine water content of the paper and dielectric oil.

(US 6459995) Collister cites U.S. Pat. No. 5,272,444, by Cox, describing a method for measuring the water content and salinity of a petroleum stream via measurement of temperature, resistivity and dielectric constant.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James C Kerveros whose telephone number is (703) 305-1081. The examiner can normally be reached on 9:00 AM TO 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (703) 305-9595. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.

James C Kerveros
Examiner
Art Unit 2133

U.S. PATENT OFFICE
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By: 11/21/03

Date: 21 November 2003
File: Non-Final Rejection

ALBERT DECADY
SUPERVISORY PATENT
TECHNOLOGY CENTER